

**PATENT APPLICATION**  
**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of

Docket No: Q81522

Munetaka WATANABE, et al.

Appln. No.: 10/593,288

Group Art Unit: 2814

Confirmation No.: 8457

Examiner: Bilkis Jahan

Filed: September 18, 2006

For: TRANSPARENT POSITIVE ELECTRODE

**DECLARATION UNDER 37 C.F.R. § 1.132**

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Munetaka WATANABE, hereby declare and state:

THAT I am a citizen of Japan;

THAT I have received the degree of Master of Engineering in 1992 from Seikei university in  
Tokyo, Japan;

THAT I have been employed by SHOWA DENKO K.K. since April 1, 1992, where I hold a  
position as a researcher, with responsibility for research and development of LED devices ;

THAT I am one of the inventors of the subject matter described and claimed in the  
above-identified application, and that I am familiar with the Office Action dated September 21,  
2009 where U.S. Patent No. 6,331,450 to Uemura was cited as disclosing a contact metal layer  
having a thickness of about 0.3  $\mu\text{m}$ .

The following experiments were carried out, either by me or under my direct supervision.

The transmittance of two Pt film samples with a thickness of 7.5 nm and 311 nm (i.e., a thickness of about 0.3  $\mu\text{m}$ ), respectively, were investigated and tested.

#### **Experimental procedure**

The Pt film was deposited on a glass substrate by sputtering, and the transmittance of the resulting Pt film in the visible light region (350 nm to 700 nm) was measured, according to the following conditions.

Sputtering conditions: pressure 0.4 Pa, DC output 1000 W

Pt film thickness: measured by using DEKTAK manufactured by Veeco

Transmittance: measured by using spectrophotometer UV2450 manufactured by Shimadzu

#### **Results**

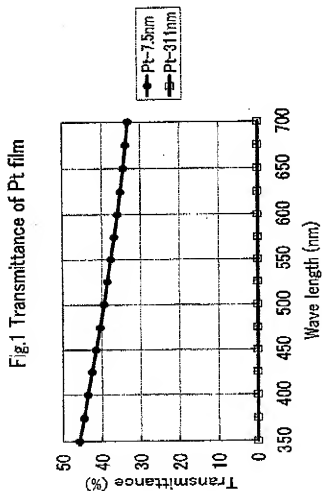
The results of the measured transmittances of the two Pt film samples are shown in Table 1 and Figure 1 below.

The Pt film having the thickness of 7.5 nm has a transmittance in the range of 33% to 46%. The Pt film having the thickness of 311 nm has a transmittance in the range of 0.005% to 0.014%. In particular, at the wavelength of 450 nm, i.e., blue light, the Pt film having a thickness of 7.5 nm has a transmittance of 41.5%, whereas the Pt film having a thickness of 311 nm has a transmittance of 0.014%.

Therefore, these test results demonstrate that a Pt film having a thickness of 7.5 nm is transparent, whereas a Pt film having a thickness of 311 nm is not.

Table 1 Transmittance (%)

Pt thickness	Wavelength (nm)							
	350	400	450	500	550	600	650	700
7.5 nm	45.8	43.6	41.5	39.4	37.7	35.9	34.4	33.1
311 nm	0.005	0.014	0.014	0-014	0.014	0.012	0.012	0.011



Discussion

Present claim 12 is directed to a gallium nitride-based compound semiconductor light-emitting device comprising a transparent positive electrode, including a contact metal layer having a thickness of from 0.1 to 7.5 nm. The Examiner cited U.S. Patent No. 6,331,450 to Uemura as disclosing a contact metal layer having a thickness of 0.3  $\mu\text{m}$  (i.e., 300 nm), and considered that it would have been obvious to use any suitable thickness for the device. However, I respectfully disagree. As I show above, the contact metal layer of Uemura having a thickness of about 0.3  $\mu\text{m}$  does not transmit light, such that there is no apparent reason to reduce the thickness of the contact metal layer by forty fold (to an upper limit of 7.5 nm) so as to obtain a *transparent* contact metal layer having a property opposite that of the *opaque* contact metal layer of Uemura.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 12/16/2009

Munetaka Watanabe  
Munetaka WATANABE